F·A·A·M facility for airborne atmospheric measurements

FLIGHT FOLDER

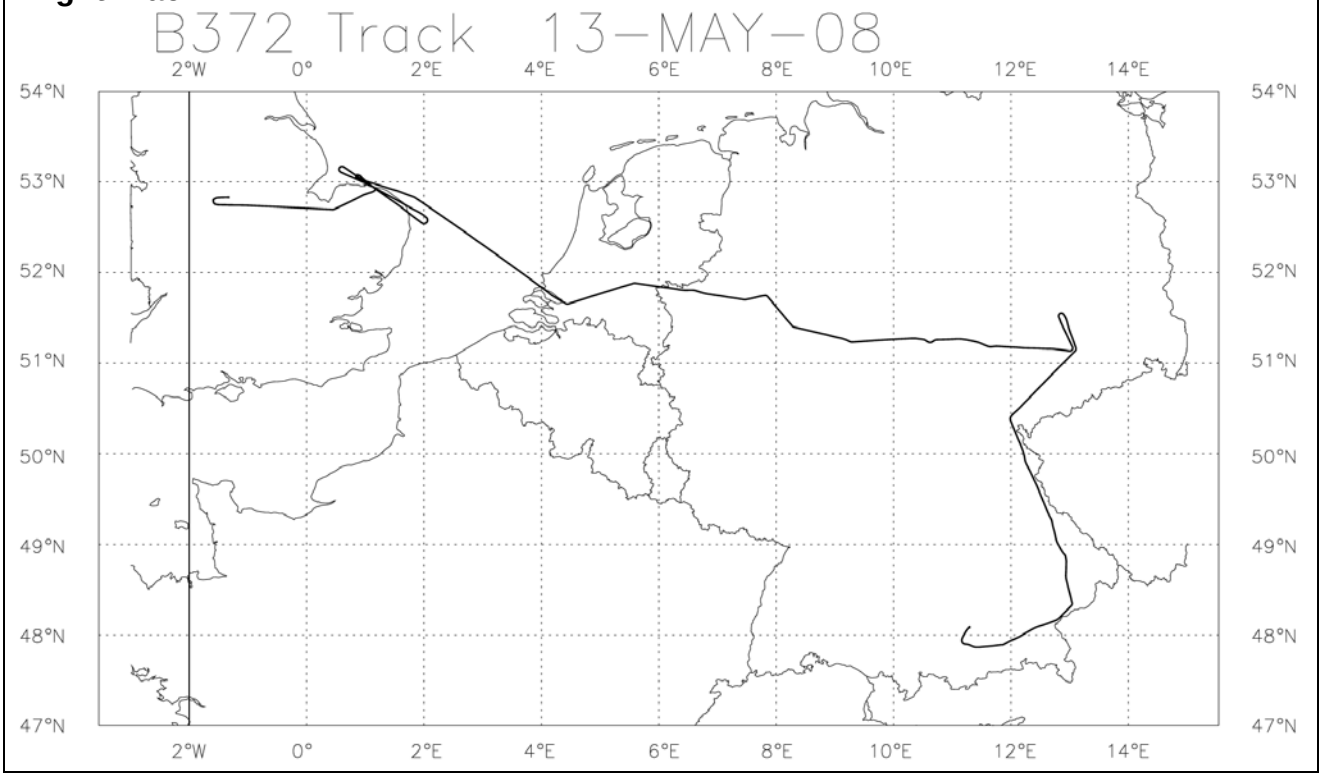
Flight No.	B372
Date:	13 May 2008
Take Off:	08:56:44Z
Landing:	13:28:19Z
Flight Time	

Campaign: EUCAARI

Operating Area: N Germany, Netherlands & UK Operating Area D

POB	Position	Name	Institute	Logs y/n
1	Captain	Alan Roberts	DFL	
2	Co-pilot	Latti Lathouwers	DFL	
3	CCM1	Dawn Quinn	DFL	
4	Mission Scientist 1	Claire McConnell	University of Reading	y
5	Flight Manager	Alan Woolley	FAAM	
6	Cloud Physics / CGPS / CCM2	Jim Crawford	FAAM	y
7	CCN	Steve Cowan	FAAM	
8	Wet & Dry Neph / PSAP / Filters / CVI	James Bowles	Met Office	Y/n/y/n/n
9	SWS	Debbie O'Sullivan	Met Office	Y
10	AMS	Paul Williams	University of Manchester	N
11	2D-S / CAPS / CPI	Dantong Liu	University of Manchester	N
12	PAN / TDLAS / Core Chem	Robert Wells	FAAM	Y
13	Mission Scientist 2	Megan Northway	University of Reading	
14	Engineer	Simon Tooley	Avalon	
15	DFL OPS	Peter Chappell	Directflight	
16	SP2	Ian Crawford	University of Manchester	

Flight Track:



FLIGHT SUMMARY

Flight No B372
Date: 13/05/08
Project: Eucaari
Location: Central Germany, North Sea

Start Time	End Time	Event	Height (s)	Hdg	Comments
084422		Start-Up	1.9 kft	349	
084846		taxy	1.9 kft	349	
084925		ASP open	1.9 kft	006	
085228	085557	Pirouette 1	1.8 kft	224	
085644		T/O	1.9 kft	222	From Oberpfaff.
085808	090340	Profile 1	3.2 - 8.6 kft	211	
090041		JW/nevz zero	6.0 kft	100	
090340	090803	Profile 2	8.7 - 5.0 kft	084	
090630		Waypoint	6.4 kft	064	A9
090957	091051	Profile 2	5.0 - 4.4 kft	061	resume
091210	091340	Profile 2	4.4 - 3.7 kft	063	resume again
091340	092609	Run 1	3.7 kft	074	
092001		Waypoint	3.7 kft	047	A10
092609	092732	Profile 3	3.7 - 5.2 kft	007	
092733	094236	Run 2	5.2 - 5.1 kft	357	
093353		waypoint	5.2 kft	352	A54
094237	094340	Profile 4	5.1 - 4.3 kft	337	
094341	094917	Run 3	4.3 kft	334	
094918	095354	Profile 5	4.4 - 9.0 kft	339	
095354	100711	Run 4	9.0 kft	049	
100651		Waypoint	9.0 kft	014	A52
100711	101306	Profile 6	9.0 - 2.6 kft	339	
100939		Qnh	6.7 kft	340	1018
101306	103508	Run 5	2.6 kft	325	
101323		Waypoint	2.6 kft	292	Melpitz
102021		Waypoint	2.6 kft	203	A52
102822		Waypoint	2.6 kft	275	F8
103508	103601	Profile 7	2.6 - 3.2 kft	297	
103602	105628	Run 6	3.2 - 3.5 kft	287	
105613		waypoint	3.2 kft	297	f7
105629	105649	Profile 8	3.5 - 3.7 kft	296	
105649	110811	Run 7	3.7 kft	291	
110453		waypoint	3.7 kft	305	F6
110811	111003	Profile 9	3.7 - 2.2 kft	322	
111003	111519	run 8	2.2 kft	324	
111139		Waypoint	2.2 kft	271	F5
111450		Waypoint	2.2 kft	269	F4
111519	112201	Profile 10	2.2 - 8.5 kft	280	
112206	112504	Profile 11	8.5 - 5.5 kft	287	
112540	112641	Profile 11	5.4 - 4.5 kft	279	resume
112641	114311	Run 9	4.5 - 4.3 kft	279	
113150		Waypoint	4.4 kft	252	D1/F2
114220		waypoint	4.4 kft	280	j2
114311	114356	Profile 12	4.3 - 3.5 kft	302	
114356	115839	Run 10	3.5 kft	304	
114938		QNH	3.5 kft	309	1017
115839	120250	Profile 13	3.5 - 0.84 kft	309	
120250	120629	Profile 14	0.84 - 3.0 kft	311	
120629	121303	Run 11	3.0 kft	309	
121304	121730	Profile 15	3.0 - 1.3 kft	293	
121653		QNH	1.5 kft	292	1020
121730	122225	Run 12	1.3 kft	293	
122002		waypoint	1.3 kft	292	weybourne
122414	123634	Profile 16	1.3 - 14.8 kft	132	
122711		abeam	4.1 kft	128	weybourne
122907		Lower BBRs	6.4 kft	128	covered
123832	124524	Profile 17	14.8 - 7.8 kft	311	
124525	124731	Run 13	7.8 kft	301	
124805	125305	Run 14	8.3 kft	303	
124900		Abeam	8.3 kft	308	weybourne

```
125500  130032   Run 15              6.3 kft         115 end @ weybourne
132819           Land              0.10 kft         083 at East Midlands, UK
133213           Shutdown          0.09 kft         180
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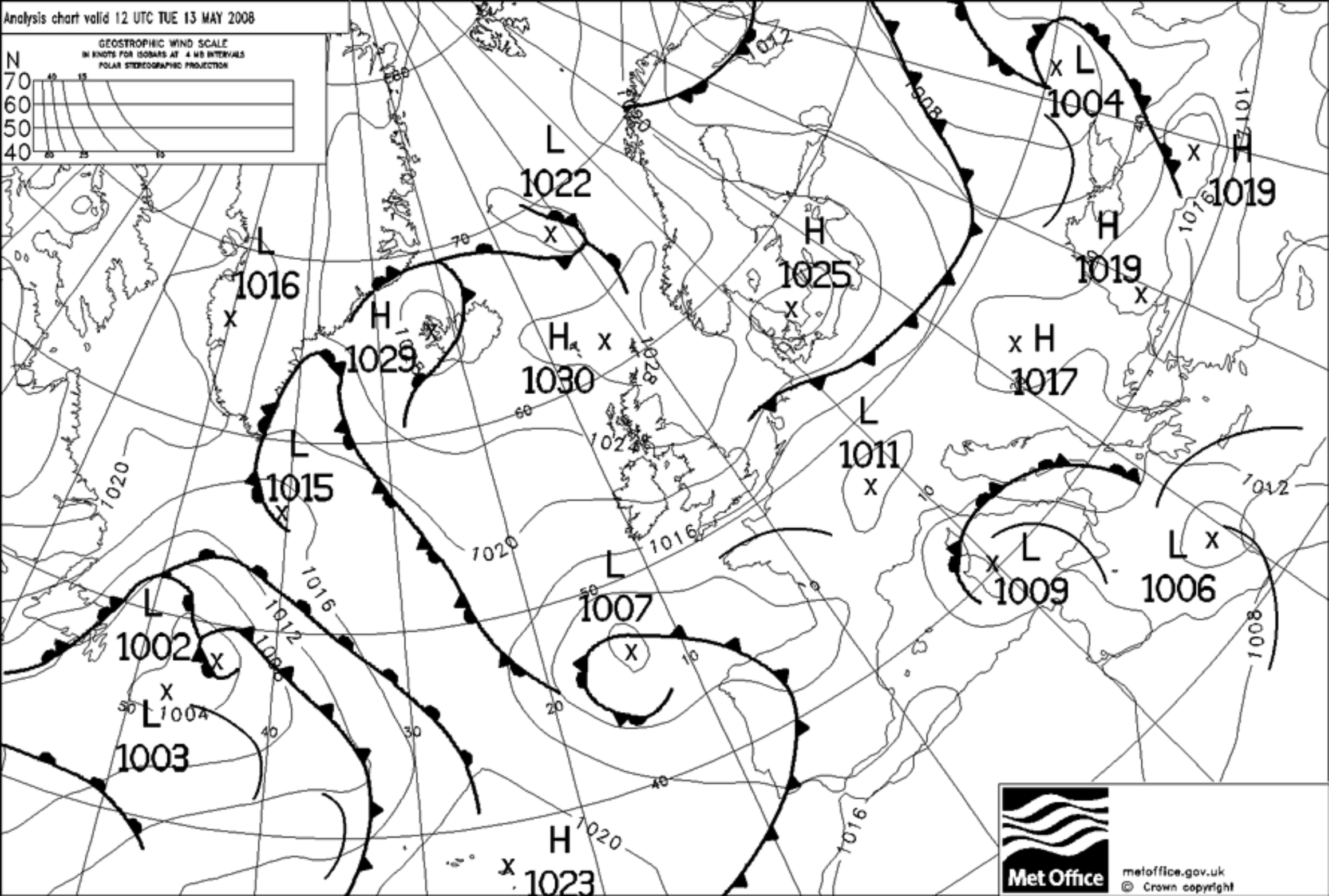
Analysis chart valid 12 UTC TUE 13 MAY 2008
GEOSTROPHIC WIND SCALE
IN KNOTS FOR ISOBARS AT 4 MB INTERVALS
POLAR STEREOGRAPHIC PROJECTION
N
70
60
50
40
L 1022
H 1025
L 1004
H 1019
L 1016
H 1029
H 1030
H 1019
H 1017
L 1015
L 1011
L 1007
L 1009
L 1006
L 1002
L 1004
1003
H 1023
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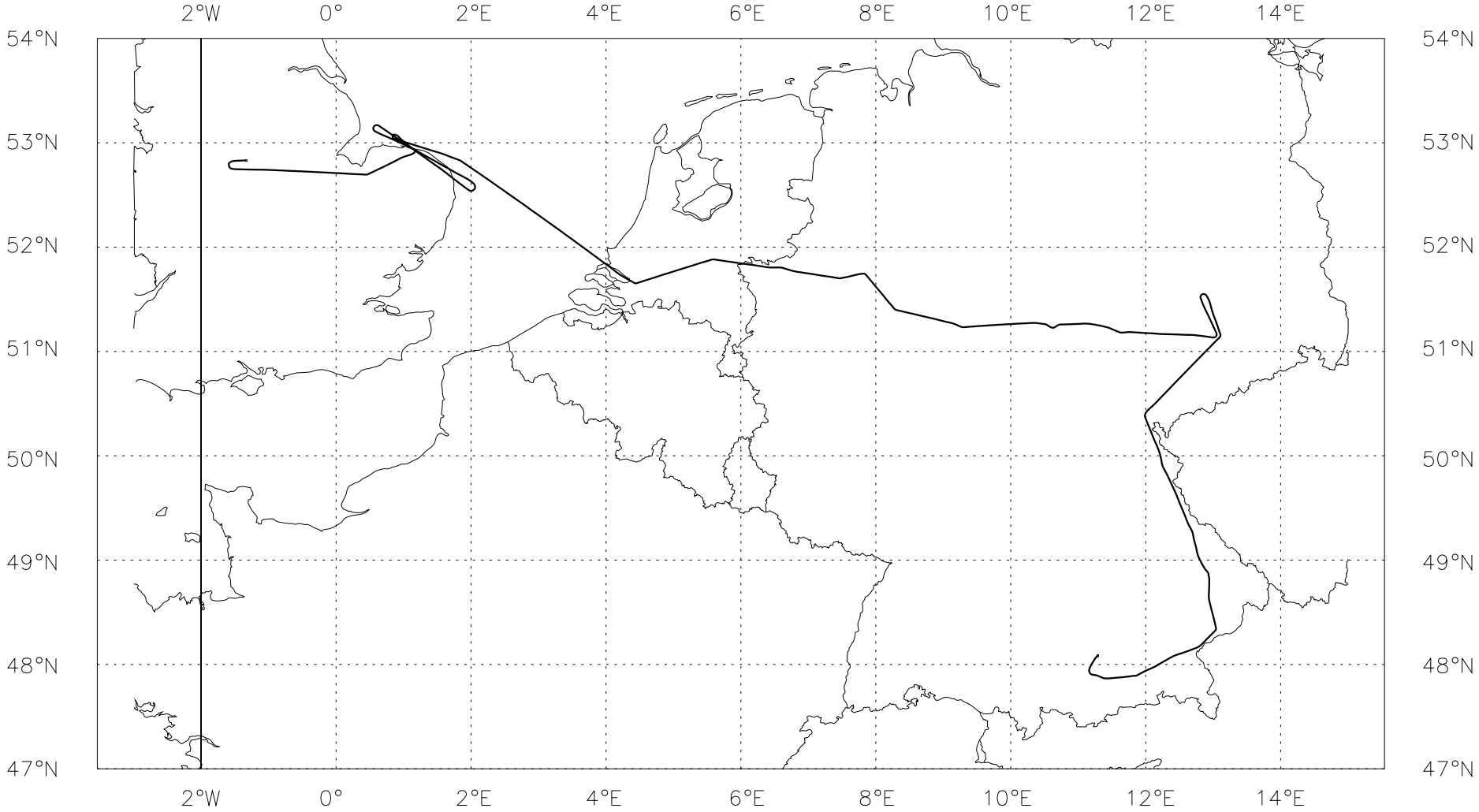
B372 Track 13-MAY-08



EUCAARI Flight B372 **Tuesday 13th May, 2008**
FAAM sortie brief

1. Pilot 1 (Directflight) – Alan Roberts
2. Pilot 2 (Directflight) – Luc Lathouwers
3. CCM (Directflight) – Dawn Quinn
4. Core Chemistry/CCN - Jamie Trembath
5. Flight Manager – Alan Woolley
6. AMS – Paul Williams
7. Cloud Physics – Phil Rosenberg
8. SP2 – Ian Crawford
9. SWS/SHIMS – Debbie O'Sullivan
10. Wet Neph – James Bowles
11. Mission Scientist – Claire McConnell
12. Mission Scientist – Megan Northway
13. Engineer - ???
14. Finance – Bob Wells
15. Peter Chappell

Other comments:
Power on at: 0500Z
Take off: 0900Z
Landing at East Midlands: 1400Z

Operating Area:
Low level S-N route to the east of Germany (A9, A10/A55, A54, A53, A52, A51) to the Melpitz region, and then along the E-W low level route through central Germany (F10, F9, F8, F6, F5, F4, F3, F2) into the Netherlands, exiting at low level (through point J2) into the southern North Sea heading to UK points 40 and 87 for work at Weybourne and surrounding area.

Sortie Objectives:
In-situ sampling of the now complex mixture of fresh (local sources) and aged pollution (the remnants of the circulation around the persistent high pressure over western Scandinavia and the North Sea) in the boundary layer compressed into a band (forecasted to be centred on latitude 50degN) extending from southern Poland and the Czech Republic through central Germany to the Netherlands, Belgium, northern France, the southern UK and Ireland and out into the Atlantic. In-situ aerosol sampling and possible radiation measurements over the Weybourne Observatory/area.

Weather
Slack easterly flow over Germany, in the region between low pressure systems centred over Biscay, Spain and the Mediterranean, and High pressure centres to the north of Scotland and over the Black sea. Mainly precipitation free (except possibly on the eastern edge of flight track near the Czech border), some medium level clouds over Germany, and possibly fog off the coast of the Netherlands.

Flight plans and timing (PTO)

Flight plans and timing:

1. Given clear skies perform pirouette on the runway prior to take-off. (360 degree turn, at around 120 degrees per minute).

2. Take off EDMO at 0900Z (11 am local)

3. Profile descent from 5000' to MPA and carry out SLRs and sawtooth profiles (maximum altitude to be determined during flight) along the route: A9 (EDMO), A10, A54, A53, A52, A51/F10 (Melpitz), and then south and west along points F9, F8, F7, F6, F5, F4, F3, F2, into the Netherlands to exit at waypoint J2 into the North sea.

   [3 hr 10 min]

4. Carry out SLR (and sawtooth profiles as appropriate) from J2 to UK waypoint 40 and Weybourne viccinty at point 87.

   [45 min, T=3hr 55 min]

5. Profile descent over sea to 50ft, followed by immediate profile ascent to FL150 to get well above aerosol layers.

   [22 min, T=4hr 17 min]

6. Carry out SLR (minimum) 5 mins duration at FL150 (in an east-west orientation to fit within available airspace). Profile descent to conduct 5 min SLR within main aerosol layer (as determined by profile) for in-situ aerosol sampling. Profile descend to carry out 5 min SLR below main aerosol layer (as determined by profile).

   [36 min, T=4hr 53 min]

7. Recover to East Midlands airport for landing and refueling.

   [22 min, T=5hr 15 min]

Sortie Debrief

Flight Number: B372 Date: 13/05/2008

Sortie Objectives: In-situ sampling of pollution over central/northern Germany and Holland. Profile measurements of aerosol at Weybourne for lidar ground site comparison work. Possible radiation closure work at Weybourne.

Operating area: Low level EUCAARI route A9-F50 (Melpitz), F51-J2 (near Rotterdam) working northwards across eastern Germany and westwards across central Germany towards the Netherlands at around 50N. North Sea between way points J2 and Weybourne, with in-situ sampling to the north of Weybourne.

Weather: High pressure centred to the north of Scotland resulting in weak easterly flow throughout the operating area. Extensive fog off the east coast of England, extending over land to become broken low level cloud.

Summary:
A successful flight. Moderate pollution and aerosol concentrations observed over central Germany and Holland. Weaker concentrations over the North Sea and the Weybourne area, with low level fog below around 1kft.

Flight Patterns:
Clear skies at Oberpfaffenhofen allowed a pirouette to be performed on the runway for BBR calibration. Two saw tooth profiles following take off showed two distinct aerosol layers, the first below around 4.5kft with scattering around 40Mm-1, ozone 40ppb and NOx 25ppb. The second layer above 4.5kft had lower scattering at 15Mm-1, ozone 55ppb, CO 120ppb and low NOx. Run 1 was carried out at 3.7kft within the lower layer following the way points along route A, with altitudes changing occasionally depending on the terrain. CO values were very low during this time and the instrument kept dropping out. Several restarts of the instrument were necessary meaning a lot of data was missing. An ascent to FL90 was carried out to allow people to move around to look at the CO instrument. Run 4 at FL90 was right at the top of the boundary layer and gradually drifted above the BL top, resulting in a decrease in scattering.

On reaching Melpitz a profile descent was performed. Scattering picked up at around 7kft and at 4kft sulphates increased with ozone decreasing. Another sharp increase in scattering was seen below around 2.8kft. Run 5 at 2.6kft within the aerosol layer was carried out heading westwards across central Germany, with scattering around 60Mm-1, increasing amounts of sulphates and nitrates on the AMS, and increasing CCN counts. Concentrations increase progressively as we headed westwards and a filter sample was taken during Run 6 at 3.3kft. At this point the AMS was seeing around 1.5ug/cc nitrates, 2.5ug/cc sulphates and 3.4ug/cc organics. Over central Germany we performed a series of SLRs at varying altitudes due to terrain changes.

Over western German two saw tooth profiles were performed between 2.3kft and FL80, which showed some changes in structure at around 5.5kft but the vertical profile was mostly well mixed. We descended back to 4kft to within the aerosol layer and the PSAP was shut of a few times due to cloud presence. Most instruments saw

similar features to those at 2.3kft, although AMS saw increased sulphates at 4kft. We remained at 4kft until way point J2 (near Rotterdam) where we descended to 3.5kft over the North Sea due to ATC requirements. On overpassing Europoort at Rotterdam (refineries, etc.) there was a sharp increase in scattering to 70Mm-1, CO and NOx.

On approaching Weybourne we performed a profile descent which was cut short to 1000ft due to fog over the sea and broken cloud over land. At around 1.5kft there was a change in layers with scattering, CO and ozone decreasing. Unfortunately the fog at Weybourne will prevent direct comparisons with the lidar, but if the fog burnt off during the day some useful comparisons may still be possible. A run at 3.2kft brought us to Weybourne where we performed a run at 1.5kft within aerosol and a profile from 1.5kft to 12kft. At least two distinct layers were observed below and above 7kft, coinciding with a temperature inversion. No radiation work was performed due to the low level fog – instead a couple of SLRs were performed within the aerosol layers. We then headed for East Midlands Airport for a refuel before the next flight.

Problems:

CO encountered several problems and was restarted twice during the flight. Initial data during the flight appeared very low and may be suspect.
SP2 did not work for almost all of the flight.

CLM

30x1NO^{-3}

FL90 top land Pat -5.5 miles pre Melpitz

M

Mission Scientist's Log

Flight No **B**372 Date 13/5/08 Name C. McCONNELL Page 1 of 5

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					T/O OBERPFAFFENHOFEN
					following runway pirouette
085808	P1				Neph ~ 40 Mm^{-1} to
					4kft, ~20 > 4kft
090957	P2				2 clear layers of
					aerosol. AMS saw changes.
					> 4.5kft neph ~ 15 Mm^{-1},
					O_3 ~ 55 ppb, CO ~ 120 ppb,
					NO_x low. < 4.5kft
					neph ~ 40 Mm^{-1}, O_3 ~ 40 ppb,
					NO_x ~ 25 Mm^{-1}. (P1)
091340	R1	3.7kft			Neph ~ 20 Mm^{-1}. NO_x &
					neph oscillating together.
092001					A10 Passed
092609	P3	3.7 kft 5.2 kft			Climb due to terrain below
092733	R2	5.2kft			
0930					Seeing blue neph more
					than red. Smaller particles?
					Haze ahead, below Fairweather Cu
093353		5.2kft			A54
0936					AMS sulphates ↑ a bit, Nit & Orgs low
0938					CO ~ 40 ppb. Cal needed? V. low.
0940					CO now ~ 200 ppb. Post-cal!
096237	P4	to 4.3kft			

$30 \times 10^{-6} \times 3 \times 10^{3}$
$90 \times 10^{-3} = 0.09$

Mission Scientist's Log

Flight No **B** 372 Date 13/5/08 Name C. McCONNELL Page 3 of 5

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
094341	R3	62kft			~~094341~~
0946					CO died - Being re-started.
					Neph ~40Mm^{-1} now
094918	P5	9kft			Climb to allow CO problem
					sorting.
0952					A53
095354	R4	890			Scat ~30Mm^{-1}. Right @
					BL top. Clds below.
0959					CO OK now
	R4				Radar ht ↑ over run.
					scat ↓ as drift above BL top.
	P6				Melpitz
					~7kft scat ↑ slightly.
					~6kft sulphates ↑, O_3 ↓
101306	R5	2.6kft			~2.8kft scat ↑ sharply. Scat ~60Mm^{-1} AMS - sulph,
					org, nit, ↑, CCN ↑. O_3 variable
1020					A52
1026					CO ↓ for some reason. CO problems.
1027					Power stat to R.
1028					F8. Scat ~50Mm^{-1}
103508	P7				Climb due to terrain
103601	R6	3.3kft			
1036					Filters on. 1st set no good. 2nd set - 1 blk, 1 good.
					AMS ~ 1.5 nits 2.5 Sulphates
					~ 3.4 org.

Prof after FL.

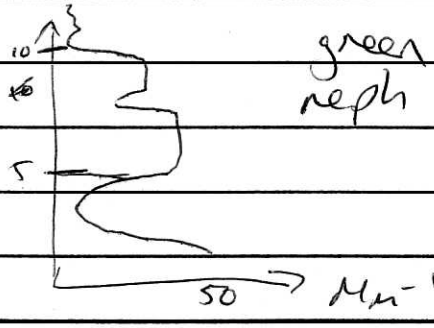
Mission Scientist's Log

Flight No **B** 372 Date 13/5/08 Name C. McCONNELL Page 3 of 5

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
105613		~~3~~			~~F7~~
105629	P8	3.8kft			
105849	R7	3.8kft			
1102					loadings ↓
110453					F6
110811	P9				
111003	R8	2.3kft			
111450					F4
111519	P10	2.3kft → ASO			~5.5kft see some
					changes. Gen. well mixed
					throughout.
112206	P11				Descend to 4.5kft
1122					Cloud entered. PSAP off.
112504	P11				Profile interrupted.
	P11				Recommence P11
112641	R9	4kft			Neph ~40Mm^{-1}
					Most instruments seeing similar
					stuff to lower level SLR.
					AMS Orgs similar, NH + Sulph ↑.
1142					J2
114311	P12	3.5kft			ATC instructions.
114358	R10	3.5kft			Neph ↑ to ~50
1148					Neph ↑ ~70Mm^{-1}, CO ↑
					NOx ↑, CO ↑. Refineries
					just passed - Europoort

Mission Scientist's Log

Flight No B372 Date 13/5/08 Name C. McConnell Page 4 of 5

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
115839	P13	~~3.5kft~~ 5kft			Over N. Sea
					Neph ~40 Mm^{-1} @ 3-5kft.
					fog z < 1000ft!
					~1.5kft change in layer.
					neph ↓, CO + O_3 ↓
120250	P14	3.2kft			1000 ⇒ 3,200ft.
120629	R11	3.2kft			
121803	P15				Descend to MPA (1000ft
					due to fog below).
					Fog over land too.
121730	R12	1.5kft.			~~Des~~ Avoiding descent to
					fog.
1220					Pass Weybourne.
					BL top ~970mb @ ~
					1.5kft (fog top)
122225		1.5kft			End R12. Turn.
12 24 14	P16				1.5 ⇒ 12kft
1226					Pass Weybourne
					~7kft T inversion. Scat ↓
					z ⇒ 7kft.
					

Mission Scientist's Log

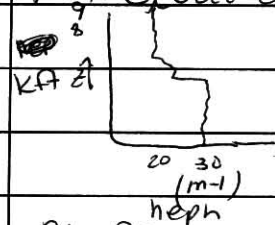
Flight No B372 Date 13/5/08 Name C. MCCONNELL Page 5 of 5

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
123832	P17				to 8kft.
124524	R13	8kft			Not much Lee - below top layer
12	P18	8.5kft			
124805	R14				Slightly higher cores, still
					quite low.
125500	R15	6.5kft			Gradient in scattering.
					Peaked then ↓ towards SE.
					Then ↑ again. Green 10-35km

Mission Scientist's Log

mission scientist - Claire

Flight No B 372 Date 13 May 2008 Name Megan Northway Page 1 of 3

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					Pirouette on runway
					clear skies at Oberpfaffenhofen
					T/o Oberpfaffenhofen
8:58:08	P1	3200ft FL090			Profile climb out of OP
					
09063:33	P2				P1-P2 reverse back to 3700ft
09:06:30			64		waypoint A9; interupt P2
090957	P2	to 3700ft			resume P2
9:19	R1	3700ft a.s.l. (2000age)			just at top of aerosol layer
9	R1				approading A10
926:09	end R1 start P3				profiling over land
9:27:33	R2	3900 age			
	R2				passing A54
9:35	R2				neph increasing as we go N wards
9:42:37	P4				profile descent to 4300
	R				
		FL090			Problems w/ CO - lamp out?
		FL090			Back on - OK now
10:09:39	P6				profile dawn over Melpitz
10:13:00	end P6 R1	2700			over head Melpitz
					Scattering up to [40 - 60 m-M10-6]
					ozone slightly elevated.

Mission Scientist's Log

Flight No **B** 377 Date 13 May 2008 Name Megan Nathan Page 2 of 3

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
10:20:00				?	pollution source ahead
10:3000					SMPS seeing monomodal aerosol
					150-280 nm - aged
					filaments in scat time series w/ R4
10:3350	RS				NO_2 peak at 10:33 - fresh
					source?
		0.6 kft			F8
10:3708	end RS start P7				climb to 3800 ft. (pressure alt)
10:50	R6	2000 a.g.l			2500 ft over terrain (3880 palt)
10:54	R6	"			SP2 has been down for some time?
					climbing to 3800 (palt), passing F7
10:56:30	P8				climb
10:56:49	R7	3800 palt			run at 3800 ft
11:06	"	"			strat-cumulus above
	P9				descent to 2300 ft
11:10:03	R8	2300 palt			2300 run over amsterdam
11:14-					F5, F4
111519	end R8 start P10				profile sawtooth to 8.5 kft
11:18Z	P10	4.8 kft			3 1/8 str above
					PSAP closed - cloud
		7500			top of sawtooth
11:25Z					traffic below - interrupt profile
11:29Z	R9	4500			run at 4500 ft
11:31	R9	4500			P1/F2 passing
					going to 2200 ft

Mission Scientist's Log

Flight No B.~~37~~2 Date 13May2008 Name Megan Northway Page 3 of 3

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
~~1~~1:35					passing over Rotterdam
~~1~~1:40					over sea
~~1~~1:58:49	~~P13~~	4500-1000			profile to 1000ft [not 50 b/c of fog]
12:02:50	P14	1000-~~3000~~			fog below us ~~over~~ over sea
12:06:29	R11				Run at 3000 ft
					- still fog below us -
12:07	R11 end				thick fog below us
	R11/P15				waypoint 40 - above fog [clear skies above]
12:	P15	3000-1500			profile over Weybourne
12:17:30		1500			just above fog
12:19					pass Weybourne (fogged in) (over sea)
					~~scavenging~~ ~~AMS~~ ? by fog ?
					largest particles lost in SMPS
12:26-					weybourne again
					SP2 still out, out for most of flight
12:	R				Run at 8000
					~~8000~~ finishing run at 8500
					band removed at 8000
					low aerosol. higher just above at 8500

CLOUD PHYSICS LOG Flight B372

Date: 13 may 08	Operator: JC	DRS Time:	DAU1 Time:	DAU2 Time:	DAU3 Time:	Aux1 Time:	Aux2 Time:	Page 1 of 1

090000
seadas b372.dat
2dp turned off after t/o – noise though quiet on ground
2dc ok
pcasp ok vref 7.46, flow ok
sid1 b372-1.srd
ffssp recording

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
091340																	Start run 1, fl036
091500	700		1	3		0	0										
092000	650		1	3		0	0										
092500	760		2	3		0	0										
092609																	End run 1, start p3
	400		2	3		0	0										Fl050
092733																	End p3, start run 2
093000	880		2	3		0	0										
093500	785		2	3		0	0										
094000	1000		2	3		0	0										
094237																	End run 2
094341																	Start run 3
094500	1200		3	3		0	0										
094917																	End run 3
095354																	Start run 4
100000	570		3	3		0	0										
100500	695		4	3		0	0										
100711																	End run 4, stert p6
	900		4	3		0	0										Fl080
	833		4	3		0	0										Fl070

PCASP Reference Volts =	FFSSP Reference Volts =	2D2-C End element 1 voltage =	CIP25 End element 1 voltage =	CIP100 End element 1 voltage =
PCASP Flow rate =		2D2-C End element 32 voltage =	CIP25 End element 64 voltage =	CIP100 End element 64 voltage =
	SID2 Laser power =	2D2-P End element 1 voltage =		

CLOUD PHYSICS LOG Flight B372

Date: 13 may 08	Operator: JC	DRS Time:	DAU1 Time:	DAU2 Time:	DAU3 Time:	Aux1 Time:	Aux2 Time:	Page 2 of 2

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
	1000		4	3		0	0										Fl060
	1100		4	3		0	0										Fl050
	1200		4	3		0	0										Fl040
	1800		4	3		0	0										Fl030
101306																	End p6 start r5
101500	1425		4	10		0	0										
102000	1250		5	5		0	0										
102500	1200		5	5		0	0										
103000	1200		5	5		0	0										
103500	1500		6	5		0	0										
103508																	End run 5 start profile 7
103601																	End p7 start run 6
104000	1200		6	5		0	0										
104500	1400		7	5		0	0										
105000	1200		7	5		0	0										
105500	1100		7	5		0	0										
105629																	End run 6 start p8
105659																	End p8 start run 7
110000	750		8	5		0	0										
110500	950		8	3		0	0										
110816																	End run 7 start profile 9
111000	1240		8	3		0	0										End profile 9, start run 8
111500	1100		9	3		0	0										End run 8 start profile 10
	640		9	3		0	0										Fl040
	500		9	3		0	0										Fl050
	580		9	3		0	0										Fl060
	480		9	3		0	0										Fl070
	390		9	3		0	0										Fl080
																	End profile 10, start profile 11
	800		143	4000		0	0										Fl080
	1150		168	10		0	0										Fl070 cloud 2dp on – noise – off
	1000		168	5		0	0										Fl060
112641	1200		168	3		0	0										End profile 11 start run 9
113000	1100		169	3		0	0										
113500	1000		169	3		0	0										
114000	950		169	3		0	0										
114311	750		169	3		0	0										End run 9 start p12
114355	1500		169	3		0	0										End p12 start r 10
114500	716		169	3		0	0										
115000	850		170	3		0	0										

PCASP Reference Volts =	FFSSP Reference Volts =	2D2-C End element 1 voltage =	CIP25 End element 1 voltage =	CIP100 End element 1 voltage =
PCASP Flow rate =		2D2-C End element 32 voltage =	CIP25 End element 64 voltage =	CIP100 End element 64 voltage =
	SID2 Laser power =	2D2-P End element 1 voltage =		

CLOUD PHYSICS LOG Flight B372

Date: 13 may 08	Operator: JC	DRS Time:	DAU1 Time:	DAU2 Time:	DAU3 Time:	Aux1 Time:	Aux2 Time:	Page 3 of 3

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
115500	900		170	5		0	0										
115840																	End run 10 start p14
	1100		170	3		0	0										Fl030
	1000		170	3		0	0										Fl020
	1240		170	3		0	0										Fl010
	900		170	3		0	0										Fl010
	800		171	3		0	0										Fl020
120629	750		171	3		0	0										Fl030 end p14 start run11
121000	340		171	3		0	0										
121230																	End run 11 start profile 15
	37		171	1		0	0										Fl020
121730	800		171	5		0	0										Fl015, end profile 15 start run 12
122000	729		172	5		0	0										
122230	1000		172	10		0	0										Endrun 12
122413	1200		173	10		0	0										Start profile 16
	200		173	3		0	0										Fl030
	600		173	3		0	0										Fl040
	700		173	3		0	0										Fl050
	655		173	3		0	0										Fl060
	350		173	3		0	0										Fl070
	500		173	3		0	0										Fl080
	373		173	3		0	0										Fl090
	27		173	1		0	0										Fl100
	75		173	1		0	0										Fl110
	50		173	1		0	0										Fl120
	31		173	1		0	0										Fl130
	42		173	1		0	0										Fl140
	30		173	1		0	0										Fl150 end profile 16
	41		173	1		0	0										Fl140 start profile17
	80		173	1		0	0										Fl130
	105		173	1		0	0										Fl120
	165		173	1		0	0										Fl110
	142		173	1		0	0										Fl100
	500		173	1		0	0										Fl090
	400		173	1		0	0										Fl080 end profile 17 start run 13
124525																	
125000	260		173	3		0	0										Run 14
125300	167		174	3		0	0										End run 14
125500	405		174	3		0	0										Run 15
130000	557		174	3		0	0										

PCASP Reference Volts =	FFSSP Reference Volts =	2D2-C End element 1 voltage =	CIP25 End element 1 voltage =	CIP100 End element 1 voltage =
PCASP Flow rate =		2D2-C End element 32 voltage =	CIP25 End element 64 voltage =	CIP100 End element 64 voltage =
	SID2 Laser power =	2D2-P End element 1 voltage =		

CLOUD PHYSICS LOG Flight B372

Date: 13 may 08	Operator: JC	DRS Time:	DAU1 Time:	DAU2 Time:	DAU3 Time:	Aux1 Time:	Aux2 Time:	Page 4 of 4

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
130030																	End run 15
																	End science
130500																	Probe recording finished

CLOUD PHYSICS PROCESSING LOG

Flight number: B372 T/O:085644
Date of Flight: 13 May 2008 Land: 132819

A) FFSSP PROCESSING		
Processing Stage	Completed	Comments
1) Transfer *.txt files from DVD to PC Bnnn_FFSSP_hh.txt for each hour of data Bnnn_FFSSP_HVMS.txt		
2) FTP the files (ascii) from the PC to the directory PMSDATA: on FLOODS		
3) RUN MRFB:[PMS.FAST_FSSP]FSSP_EXTRACT_TAS a) Flight number: Bnnn b) Path name: MFDDATA:Bnnn_MFDX c) Output directory: PMSDATA: d) Start time: 0 if unknown e) End time: 240000 if unknown		NB Always use 0 and 240000 as times
4) RUN MRFB:[PMS.FAST_FSSP]FFSSP_PROCESS_TXT a) Flight number: Bnnn b) Directory: PMSDATA: c) TAS in processing: Y d) Vel threshold (clicks) 0 e) Calibration file: Use the most recent calibration file. Format FFSSP_CALddmmyyyy.txt Calibration files to be stored in MRFB:[PMS.FAST_FSSP] f) Adjust FFSSP time Y/N g) If Y, enter value to add to data time (seconds)		Note the calibration file used Total Glitches = Sec File written ok? Yes only if gross errors occur in FFSSP time eg; ~ 1hour
5) In PVWAVE a) enter: !path=!path+',mrfb:[pms.proc]' Note that the comma before "mrfb" is important! b) write_procffssp_to_m5,'pmsdata:Bnnn_procffssp.dat', 'mfddata:Bnnn_mfdX','pmsdata:Bnnn_m5procffssp',/auto 1st argument is output file from 5) 2nd argument is the MFD 3rd argument is the new FFSSP data file in M5 format		Note the correction applied to FFSSP time by /auto
c) exit		
6) MODIFY a) Modifying datasets: pmsdata:Bnnn_m5procffssp b) Datset: mfddata:Bnnn_mfdX c) New dataset: Enter updated MFD name d) Parameter description file: leave blank to use default		Note original and subsequent File sizes
7) CHECKS:		
i) FFSSP and JW/Nevzorov LWC – are they correctly synchronized in time?		
ii) If not, may be necessary to repeat 5b) using addt=x keyword. This adds x sec to FFSSP time.		

CLOUD PHYSICS PROCESSING LOG

Flight number: B372
Date: 13 May 2008

B) 2D PROCESSING		REPROCESS +1hr
Processing Stage	Completed	Comments
1) Transfer Bnnn.dat file from CD/DVD to PC	15 May 08	
2) Zip up file on PC (Bnnn.zip)	15 May 08	
3) FTP the zipped file (binary) from the PC to the directory SEADAS_DATA:[SEADAS_DATA] on FLOODS	15 May 08	
4) Log on to FLOODS		
5) unzip SEADAS_DATA:[SEADAS_DATA]Bnnn.zip	15 May 08	
6) In PVWAVE i) !PATH=!PATH+',MRFB:[PMS.PROC]' ii) CONVERT_SEADAS_FILE a) Input file: SEADAS_DATA:[SEADAS_DATA]Bnnn.dat b) Output file: SEADAS_DATA:[SEADAS_DATA] Bnnn_seadas.dat iii) exit	15 May 08	Note the number of bad block reads and/or final numbers of blocks read & written Blocks read 33143 Blocks written 33143 Bad reads 0
7) run MRFB:[PMS.SEADAS]READM200_FILE a) Default directory: PMSDATA: b) Flight number: Bnnn c) Disk file name: SEADAS_DATA:[SEADAS_DATA] Bnnn_seadas.dat d) Comment string: e) Start time: 0 if unknown f) End time: 240000 if unknown g) Read 2DC: Y h) Read 2DP: Y i) Secondary data Y j) FSP-SYNC: Y k) cmd.str: Y l) Auto time correction: N m) Full length secondary: N	T/O – 5 min Land + 5 min 15 may 08	Note times Ignore error message scroll Vestigial error from tapes Check FRW, FSP, IMB, PCA And SEC files exist and have Data
8) 2D image display and printing Quick look at image blocks if required In PVWAVE i) !PATH=!PATH+',MRFB:[PMS.PROC]' i) WAVE> IMAGEDISPLAY a) 2D directory name: PMSDATA: b) Flight number: Bnnn c) IWC plot: N d) Select probe: (1) 2DC (2) 2DP e) Start time: 0 if unknown f) End time: 240000 if unknown g) Time interval (sec): 0 for every image block nominal 5 sec		This must be done from Floods itself Note any problems with images 2DC – no data 2DP – noise, turned off after T/O

Preparation of imagery for Core data product		
iii) WAVE> auto_image a) 2D directory name: PMSDATA: b) Flight number: Bnnn c) Enter date: YYYYMMDD d) Enter start time 0 if unknown e) Enter end time 240000 if unknown f) Enter time interval (sec) between successive imaged blocks 10 iv) exit PVWAVE Creates files	 085000 133000 10 PMSDATA:	Copy nos of pages to be produced 10 Time to closest previous min FAAM_YYYYMMDD_R0_Bnnn_2Dx-IMAGES.PS
ftp *.PS files from PMSDATA: to PC		Note files are ascii
Load each into Ghostview or other pdf-converter		
Output as pdf file (70 dpi resolution) and append name prefix of CORE-CLOUD-PHY_ to converted files		NO DATA FILES PRODUCED
9) run MRFB:[PMS.SPEC2D.AUTO]PROCESS2D_AUTO a) Flight number: Bnnn b) Directory: PMSDATA: c) File generation: Hit enter d) Time correction: Time offset of the 2D data	NOT RUN	NB an error message may Appear, floating point Exception, rerun and use Time quoted in error Message, repeat until
e) TAS: Y f) MFD directory: MFDDATA:Bnnn_MFDX g) Probe number: (1) 2DC (2) 2DP (0) Both 0 unless either probe known to be faulty h) Start time: 0 if unknown i) End time: 240000 if unknown j) Nominal averaging: 0.2 seconds for conversion to M5 k) Particle type: 8 if known to be in ice cloud 11 if known to be in water cloud 8 if known to be in mixed-phase 8 if unknown l) Coefficient choice: 2 m) Output root filename: PMSDATA:Bnnn_PROC2D	 T/O + 30sec Land – 30sec	Successful. Note time data processed up to Check 2dproc files present 2dc, 2dp and dat
10) In PVWAVE i) enter: !PATH=!PATH+',MRFB:[PMS.PROC]' Note that the comma before "mrfb" is important! ii) WRITE_PROC2D_TO_M5, 'PMSDATA:BNNN_PROC2D.DAT', 'PMSDATA:BNNN_M5PROC2D' iii) exit	NOT RUN	Error message about HDDR File should be ignored. Note records Note file size
11) MODIFY a) Modifying datasets: pmsdata:Bnnn_m5proc2D b) Datset: mfddata:Bnnn_mfdX c) New dataset: Enter modified MFD name d) Parameter description file: leave blank to use default	NOT RUN	
12) CHECKS:	NOT RUN	
i) Is 2DC/2DP IWC of comparable magnitude and well-correlated with Nevzorov TWC?		

CLOUD PHYSICS PROCESSING LOG

Flight number: B372
Date: 13 May 2008

C) PCASP PROCESSING		
Processing Stage	Completed	Comments
1) Complete stage 7) in 2D processing Ensures Bnnn_FSP.DAT containing raw PCASP data is written to directory PMSDATA:	15 May 08	
2) run MRFB:[PMS.PCASP]PROCPCASP_NEW		Note the min size channel
a) Flight number: Bnnn	0.75	Note the volume flow rate
b) File name: PMSDATA:Bnnn_FSP.DAT		
c) Root output name: PMSDATA:Bnnn_PROCPCASP Produces PMSDATA:Bnnn_PROCPCASP.DAT (binary) PMSDATA:Bnnn_PROCPCASP.OUT (ascii)		
d) Minimum size channel: Default = 1 If smallest size channel are known to be noisy the value of the highest noise free channel to be entered here		
e) Calibration volume flow rate: Use the most recent value. 1.8ccs^{-1} (Calibration files to be stored in **Exeter** Entering zero gives default value = 1.0 cm3/sec	0.75	Measured at instrument
f) Time correction: Same value as used in 2D processing stage 9 d)	0	
g) Start time: 0 if unknown	090000	
h) End time: 240000 if unknown	132500	
3) In PVWAVE		
i) enter: !PATH=!PATH+',MRFB:[PMS.PROC]' Note that the comma before "mrfb" is important!		
ii) write_procpcasp_to_m5,'pmsdata:Bnnn_procpcasp.dat','pmsdata:Bnnn_m5procpcasp'		
iii) exit		
4) MODIFY		
a) Modifying datasets: pmsdata:Bnnn_m5procpcasp		
b) Datset: mfddata:Bnnn_mfdX		
c) New dataset: Enter modified MFD name		Mfddata:b372_tas_pcasp
d) Parameter description file: leave blank to use default		

P.S.A.P. Log

Flight No. **B**.372..... Date 13/05/08..... Page ..1 of .1.....

GMT	Filter Trans.	Flow Rate	B_a x 10^{-6}	Ph_det levels		Run	Remarks
Set to DRS time	New filter Tr = 1.000	Set to 3.0 lpm				(30s) ? Ave = s	←Preflight
090500	1	2.75	.6	15	42		pump on.
105855	790						pump off
110010	1	2.75	4.3	15	47		pump on
110308	1						O'ring not in, replaced, pump off/on Trans reset to 1.0
130140	.899	2.59	0	14	48	E.O.S.	pump off

Flight No: B371 **Date: 13/5/08** **Operator:J Bowles**

Type of filters mounted in	Upper inlet:	Lower inlet:

Disk No 1 (top)	Disk No 2 (middle)	Disk No 3 (bottom)	Inlet Upper/ Lower	Time Pump On	Time Pump Off	Run	Accum Vol [l]	Comments eg. Filter Exposure No, period in cloud, change of level etc.
36	37	116	L	104120	111506		37	not working, use as blank
26	29	?	U					not working, bagged.
19	20	149	U	104100	111506		2272	
31	33	132	U					not working, after quick test, bagged.

Wet Nephelometer Log

Flight No **B**. 372 Date ...13/5/08 Operator's name: J Bowles Page .....1. of ....2...

GMT	Run	Height	Sample flow	Dry neph RH	Wet neph RH	Temp ramp	T_{water}	Remarks
0910	p2		15.8	20	81	45		Maintain 85% for sawtooths to Melpitz
092150		3500	15.2	22	86	10		try for RH cycle on run
092610	p3			24	51			just missed end due to profile
092810	r2	5000	14.5	23	59	45		
093959	r2	5000	14.6	26	85	10		
094820	p	to 5000	14.8	24	49	45		profile up to fix CO instrument
095410	r4	9000	14.9	20	73			Aim to maintain 85% as only 13min to profile.
101406	r5	2700	15.7	39	85	10		run from Melpit
102520		2500	15.8	35	47	45		
103601	r6	3200	15.5	37	85	10		
104530		3200	15.4	41	49	45		
105740		3600	15.2	34	85	10		
110550	r7	3700	15.2	32	46	45		
110900	p9							prf 9 started, quick rise to 85%
112710		4500	14.8	26	86	10		peaks @ 1.5-1.6 at 85%
113920		4500	14.8	27	39	45		
120759	r11	3000	1.5	28	85	10		Half a cycle. 1.4-1.5 @85% on previous cycle
121745	r12	1500	15.4	39	48	45		run too short, only made it to 74%.
122400					86			leave at 85 for profile to 12000
123325		10000	14.3	9	84.5			Chiller off.

Wet Nephelometer Log

Flight No **B**..372 Date ..13/5/08 Operator's name: …J Bowles Page ....2. of .....2.

GMT	Run	Height	Sample flow	Dry neph RH	Wet neph RH	Temp ramp	T_{water}	Remarks
124506		7500						chiller back on, aim for 85%
125600		6000	17.1	25.6	87			leave at 85%, only 5min run. followed by E.O.S.

Flight: B372

KEY

- Not Fitted
- Fitted, Not Operated
- Duff Data
- Minor Problems
- OK

Thermometers
- Cabin Temperature:
- Heimann:
- Deiced Temp:
- Non-deiced Temp:

Hygrometers
- FWVS:
- Buck CR2:
- General Eastern:
- Johnson Williams:
- Nevzorov:
- Total Water Probe:

Cameras
- Downward Facing:
- Forward Facing:
- Rearward Facing:
- Upward Facing:

Navigation + Aircraft
- Cruciform GPS:
- GIN Applanix:
- INU Honeywell:
- Radar Altimeter:
- RVSM IAS:
- RVSM Static Pressure:
- XR5 GPS:

Misc Core
- AMTG:
- AVAPS:
- Cabin Pressure:
- Fax machine:
- Printer:
- S9 Static Pressure:
- Satcom C:
- Satcom H:
- Turb Centre-Static:
- Turb Left Right:
- Turb Up-Down:
- Turb Horizontal Chk:
- Turb Vertical Chk:
- Weather Radar:

DLUs:
- DLU AERACK:
- DLU BBR Lower:
- DLU BBR Upper:
- DLU Core Chem:
- DLU Core Consoles:
- DLU Port Aft:
- DLU Port Fwd:
- DLU Stbd Fwd:

Radiometers
Lower:
- BBR (clear) Lower:
- BBR (IR) Lower:
- BBR (red) Lower:

Upper:
- BBR (clear) Upper:
- BBR (IR) Upper:
- BBR (red) Upper:

- ARIES:
- DEIMOS:
- IR Camera:
- JNO2 Lower:
- JNO2 Upper:
- JO1D Lower:
- JO1D Upper:
- MARSS:
- SHIMS Lower:
- SHIMS Upper:
- SWS:
- TAFTS:

Cloud Probes
- 2DC:
- 2DP:
- FFSSP:
- PCASP:
- 2DS:
- ADA:
- CAPS:
- CCN:
- CDP:
- CIP 100:
- CIP 25:
- CPI:
- CVI:
- SID1:
- SID2:

Aerosol
- CPC 3025A:
- CPC 3786 H2O:
- Filters 47mm:
- Filters 90mm:
- Neph - Dry:
- Neph - Wet:
- PSAP:
- AMS:
- CPC 3025 (AMS)
- INC:
- VACC:
- CPC 3010A (CVI):
- SP2:
- UHSAS:

Chemistry
- CO Aerolaser 5002:
- NOx TE42C:
- Ozone TE49C:
- Ozone TE49:
- SO2 TE43C:
- TDLAS (NIR) CH4:
- TDLAS (NIR) CO2:
- FAGE:
- Formaldehyde:
- NOx FAAM:
- NOxy:
- ORAC:
- PAN:
- PERCA:
- Peroxide:
- PTRMS:
- TDLAS (1C):
- WAS Bags:
- WAS Bottles:

Misc Non-Core
- CASI/ATM:
- LIDAR:
- LTI:
- SAW Hygrometer:

Report Created 20/05/2008 09:50:47

Last Updated: 15/05/2008 12:56:41

Faults / Incidents Log

Flight No. B372
Date: 13 May 2008

Instruments

1. INU – not run
2. Digital Video Box – stickle brick no longer holding it up, now resting on keyboard at aft CorCon
3. CO Nitrogen flows incorrectly set up. CO data invalid until end of Run 4. Then instrument dropped out during run 5. OK after CB reset.

Instrument Status roundup
Faults: CO data bad for first hour of flight. SP2 data suspect for the majority of the flight – configuration and pump fault in the second half of the flight may reduce available data. 2DC data extremely suspect and 2DP data noisy, despite both being cleaned before flight.

Aircraft

Nil

ISDN Emails

Nil

Satcom-H Calls

Nil

Issues

Post Flight - Turb Probe Water Traps

1. Indicate Amount of Water: a) Nil b) 1-2 drops c) ¼ full or more d) Ice present
2. Emptied by:
3. Dried by

MISSING LOG SHEETS:

The following log sheets are not available for flight B372:

Log	Reason
Pre-flighter log	No log available
Core Chemistry / TDLAS	no In Flight log except in cases of instrument problems
2D-S / CAPS / SP2 / CPI	2D-S / CAPS / SP2 / CPI operator does not create a log sheet
AMS log	AMS operator does not create a log sheet
Dry Neph	Operator does not create a log sheet
CVI	CVI was only operated on three flights : B376, B377 & B378
SWS	Awaiting confirmation whether a log exists
PAN	Operator does not create a log sheet
CCN	Operator does not create a log sheet

Document control

Revision	Date	Author	Comments
r0	25 Jul 2008	Doug Anderson	Initial version missing the above noted logs
r1			
r2			

VIDEO RECORDINGS:

3 x Forward Facing Cameras
3 x Downward Facing Cameras

Further digital video recordings in avi format:

faam-video-dfc_faam_20080513_r0_b372_091418_1hz.avi
faam-video-dfc_faam_20080513_r0_b372_101418_1hz.avi
faam-video-dfc_faam_20080513_r0_b372_111418_1hz.avi
faam-video-dfc_faam_20080513_r0_b372_121418_1hz.avi

faam-video-rfc_faam_20080513_r0_b372_091409_1hz.avi
faam-video-rfc_faam_20080513_r0_b372_101409_1hz.avi
faam-video-rfc_faam_20080513_r0_b372_111409_1hz.avi
faam-video-rfc_faam_20080513_r0_b372_121409_1hz.avi

faam-video-ffc_faam_20080513_r0_b372_091406_1hz.avi
faam-video-ffc_faam_20080513_r0_b372_101406_1hz.avi
faam-video-ffc_faam_20080513_r0_b372_111406_1hz.avi
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